[19] Patent Office of the People's Republic of China [11] Disclosure No. CN1104610A

[12] Patent Application Disclosure

[21] Application No. 93121244.8

[51] Int.Cl[6]

[43] Disclosure Date July 5, 1995 C02F 1/50

[22] Application Date December 30, 1993

[71] Applicant: People's Liberation Army Troop 59174

Address 1 Dali Ave., Tianjin, 300050

[72] Inventor(s) Yu Zuo-wen, Li Jun-wen, Cai Xin-pei, Zhan Wei, Gao Ming

[74] Patent Agent People's Liberation Army Logistics Department Patent Service Center

Agent Ding Shou-gen

C01B 11/02 A23B 7/14

Number of pages in the claim: Number of pages of attached figures:

[54] Name of Invention A type of chlorine dioxide bag and its method of manufacture

[57] Abstract

A type of chlorine dioxide bag and its method of manufacture, made by first adding beaten Sichuan bleached beeswax, stearic acid, beeswax, or paraffin to sodium chlorate microcapsules, then mixing with dried tartaric or oxalic acid particles, and placing in a non-woven cloth bag. The ratio of Sichuan bleached beeswax, stearic acid, beeswax or paraffin : sodium chlorate : tartaric acid or oxalic acid is 0.2-0.6:1:2. When used, chlorine dioxide is produced just by placing the chlorine dioxide bag in water. The chlorine dioxide produced by this invention can be used to disinfect drinking water, fruit, vegetables and other items.

(BJ) No. 1456

Claims

1. A type of chlorine dioxide bag, including sodium chlorate, tartaric acid or oxalic acid, which special characteristics include manufacture by sodium chlorate Sichuan bleached beeswax, stearic acid, beeswax, or paraffin microcapsules, in a ratio of 0.2-0.6:1:2 of Sichuan bleached beeswax, stearic acid, beeswax or paraffin : sodium chlorate : tartaric acid or oxalic acid by weight, and includes placing the mixture of the above described ingredients in a non-woven bag.

2. A method of manufacturing a chlorine dioxide bag, which is characterized by placing sodium chlorate in a molten mixture of Sichuan bleached beeswax, stearic acid, beeswax, or paraffin, using a number 20 mesh screen to produce sodium chlorate microcapsules, then mixing the sodium chlorate microcapsules with dried tartaric acid or oxalic acid particles, and packaging in a non-woven cloth bag.

Specification

A Type of Chlorine Dioxide and its Method of Manufacture

This invention belongs in the domain of chlorine dioxide disinfectants.

Chlorine dioxide is a strong oxidizer, and its germ killing effectiveness is greater than free chlorine. After disinfecting drinking water, there are basically no organic carcinogens such as methane tri-halides produced. It is already widely used to disinfect drinking water. At present, the primary method of producing chlorine dioxide disinfectant is the sodium chlorate acidification method, as it is very easy for sodium chlorate to produce a reaction with a solid acidifier, and immediately produce chlorine dioxide. All the chlorine dioxide disinfectant currently in use packages the sodium chlorate and solid acidifier separately, as in Chinese patent CN89100512, in which they are separately packaged in plastic bags; the plastic bags are opened when ready to use, and a small amount of water melts the solid acidifier, which is then poured into the sodium chlorate, making it to produce chlorine dioxide. This method is cumbersome, and very inconvenient in actual use.

The goal of this invention is to address the inadequacies of the technique described above, to provide an easy-to-use chlorine dioxide-producing bag which does not require separate packaging of the sodium chlorate and solid acidifier.

This invention is realized by mixing together Sichuan bleached beeswax, stearic acid, beeswax or paraffin with sodium chlorate; and tartaric or oxalic acid, in a ratio of 0.2-0.6 : 1: 2 by weight of Sichuan bleached beeswax, stearic acid, beeswax or paraffin: sodium chlorate : tartaric or oxalic acid. Then a number 20 mesh screen is used to produce sodium chlorate microcapsules, and the sodium chlorate microcapsules are mixed together with dried solid acidifier tartaric or oxalic acid microcapsules, following which it is packaged in a non-woven cloth bag to produce a chlorine dioxide bag. When used, one need only place the chlorine dioxide bag directly in water to produce chlorine dioxide.

This invention possesses the following advantages:

1. This invention uses microcapsules composed of Sichuan bleached beeswax, stearic acid, beeswax, or paraffin and sodium chlorate so that the sodium chlorate can be directly mixed together with dried solid acidifier particles without easily reacting.
2. Use of this invention is convenient. When using it, one needs only to place the chlorine dioxide in water, and the micro-reactive environment formed after being absorbed by the non-woven cloth bag produces chlorine dioxide.

The chlorine dioxide disinfectant can be used to disinfect drinking water, eating utensils, fruit, vegetables and other items.

Take 1000 ml of natural river water and synthetic 1.6×10^7/L *e. coli* or f_2 bacteriophage at 3.4×10^7 bacteriophage platelets /L. Place in a chlorine dioxide bag which can produce 2.0 mg/L of chlorine dioxide. After five minutes, the bactericidal rate of the infecting e. coli and bacteriophage reaches 99.999%.

Take a dry and cool apple or rice bowl with a surface coating of 1.34×10^7/L *e. coli* or 9.3×10^7 bacteriophage platelets /L. Put a liter of water in chlorine dioxide bags which can produce 15, 30, and 50 mg of chlorine dioxide, and then clean the apple or rice bowl to be disinfected in the water. After five minutes, no e. coli or f2 bacteriophage can be found on the apple, rice bowl or water.

This invention is described further through the following working examples:

Working Example 1

Weigh out 0.2 grams of Sichuan bleached beeswax, stearic acid, beeswax or paraffin, 1 gram of sodium chlorate, and 2 grams of tartaric or oxalic acid; the ratio of Sichuan beeswax, stearic acid, beeswax or paraffin to sodium chlorate and to the tartaric or oxalic acid is 0.2 : 1 : 2. Mix the Sichuan bleached beeswax, stearic acid, beeswax or paraffin into the sodium chlorate, using a number 20 mesh screen to produce sodium chlorate microcapsules. Next, mix together the

sodium chlorate microcapsules with the tartaric or oxalic acid particles, and place in a non-woven bag to produce a chlorine dioxide bag. When you use it, place the chlorine dioxide bag in water, and chlorine dioxide can be produced. After five minutes, the one using tartaric acid will produce 213.68 mg of chlorine dioxide. The one using oxalic acid will produce 235.94 mg of chlorine dioxide. When not in use, keep the chlorine dioxide-producing bag in a sealed water proof film. Under more stringent storage testing at a temperature of 37° C and relative humidity of 100% for three months, there is a 20-40% loss of chlorine dioxide; the sample without Sichuan bleached beeswax has a 100% loss after three days.

Working Example 2

Weight out 0.4 g grams of Sichuan bleached beeswax, stearic acid, beeswax or paraffin, 1 gram of sodium chlorate, 2 grams of tartaric or oxalic acid; the ratio of Sichuan beeswax, stearic acid, beeswax or paraffin to sodium chlorate and to the tartaric or oxalic acid is 0.4 : 1 : 2. Use the method in Working Example 1 to make chlorine dioxide bags. Place the chlorine dioxide bags in water to produce chlorine dioxide. After ten minutes, the one using tartaric acid will produce 213.68 mg of chlorine dioxide, and the one using oxalic acid will produce 235.94 mg of chlorine dioxide. Under more stringent storage testing at a temperature of 37° C and relative humidity of 100% for three months, there is a 20-30% loss of chlorine dioxide; while the sample without Sichuan bleached beeswax has a 100% loss after three days.

Working Example 3

Weight out 0.6 g grams of Sichuan bleached beeswax, stearic acid, beeswax or paraffin, 1 gram of sodium chlorate, 2 grams of tartaric or oxalic acid; the ratio of Sichuan beeswax, stearic acid, beeswax or paraffin to sodium chlorate and to the tartaric or oxalic acid is 0.6 : 1 : 2. Use the method in Working Example 1 to make chlorine dioxide bags. Place the chlorine dioxide bags in water to produce chlorine dioxide. After fifteen minutes, the one using tartaric acid will produce 213.68 mg of chlorine dioxide, and the one using oxalic acid will produce 235.94 mg of chlorine dioxide. Under more stringent storage testing at a temperature of 37° C and relative humidity of 100% for three months, there is a 10-20% loss of chlorine dioxide; while the sample without Sichuan bleached beeswax has a 100% loss after three days.